

Patent claims:

1. Optical imaging device, in particular an objective for microlithography in the field of EUVL for producing semiconductor elements, having a beam path, a plurality of optical elements and a diaphragm device with an adjustable diaphragm opening shape, characterized in that the diaphragm device (7, 7') has a diaphragm store (7a, 7b, 7c) with a plurality of different diaphragm openings (6, 35) with fixed shapes in each case, which can be introduced into the beam path (2).
2. Optical imaging device according to Claim 1, characterized in that the diaphragm store is designed as a revolving disc diaphragm stack (7a, 7b) with a plurality of individual revolving disc diaphragms (5) which are provided with diaphragm openings (6).
3. Optical imaging device according to Claim 2, characterized in that the revolving disc diaphragm stack (7a, 7b) is arranged outside the optical imaging device (1).
4. Optical imaging device according to Claim 2 or 3, characterized in that the revolving disc diaphragms (5) are accommodated inside the revolving disc diaphragm stack (7a, 7b) in separate plug-in units (11).
5. Optical imaging device according to one of Claims 2, 3 and 4, characterized in that the revolving disc diaphragm stack (7b) is designed displaceably in such a way that the revolving disc diaphragm (5) to be introduced into the beam path (2) can be selected by displacing the revolving disc diaphragm stack (7b).
6. Optical imaging device according to one of Claims 2 to 5, characterized in that the diaphragm device (7) has a feeder device (28) which removes the revolving disc dia-

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phragm (5) to be introduced into the beam path (2) from the revolving disc diaphragm stack (7a, 7b), in particular also from the corresponding separate plug-in unit (11), introduces it into the beam path (2), and deposits it again in the revolving disc diaphragm stack (7a, 7b) after it has been used.

7. Optical imaging device according to Claim 6, characterized in that the feeder device is designed as a moveable robot gripper arm (28).

8. Optical imaging device according to one of Claims 2 to 7, characterized in that the diaphragm device (7) has a lifting device (16, 16', 16'', 16a, 16b, 16c) for positioning the revolving disc diaphragm (5) in the beam path (2).

9. Optical imaging device according to one of Claims 2 to 8, characterized in that the diaphragm device (7) has a holding device (13, 13a, 13b, 13c, 13d) for fixing the revolving disc diaphragm (5) in the beam path (2).

10. Optical imaging device according to one of Claims 2 to 9, characterized in that one of the optical elements has a holding device (13, 13a, 13b, 13c, 13d) for fixing the revolving disc diaphragm (5) in the beam path (2).

11. Optical imaging device according to one of Claims 2 to 10, characterized in that the lifting device (16'', 16a, 16b, 16c) has a holding device (13, 13a, 13b, 13c, 13d) for fixing the revolving disc diaphragm (5) in the beam path (2).

12. Optical imaging device according to Claim 9, 10 or 11, characterized in that the lifting device (16, 16') is pressed against the holding device (13) by spring elements (17) for the purpose of dynamically decoupling the revolving disc diaphragm (5) from the optical imaging device (1).

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13. Optical imaging device according to Claims 9 to 12, characterized in that for the purpose of dynamically decoupling the revolving disc diaphragm (5) from the optical imaging device (1), the revolving disc diaphragm (5) can be fixed on the holding device (13a, 13b, 13c, 13d) via magnetic forces.

14. Optical imaging device according to one of Claims 8 to 13, characterized by a dynamic decoupling of the lifting device (16').

15. Optical imaging device according to one of Claims 2 to 14, characterized by an opening (29) through which the revolving disc diaphragm (5) can be introduced into the beam path (2).

16. Optical imaging device according to one of Claims 1 to 15, characterized by a dynamic decoupling of the diaphragm device (7).

17. Optical imaging device according to one of Claims 8 to 16, characterized in that the lifting device (16', 16'', 16a, 16b, 16c) picks up the revolving disc diaphragm (5) from the robot gripper arm (28).

18. Optical imaging device according to one of Claims 8 to 17, characterized in that the lifting device (16a) is designed as a rocker.

19. Optical imaging device according to one of Claims 8 to 17, characterized in that the lifting device (16b) is designed as a set of scales, in particular with a parallelogram guide.

20. Optical imaging device according to one of Claims 8 to

17, characterized in that the lifting device (16c) is of pantographic design, in particular having solid joints (30).

21. Optical imaging device according to Claim 1, characterized in that a sheet-metal strip (7c) which is wound onto two rollers (36) and held tensioned is provided as a diaphragm store, the sheet-metal strip (7c) having a plurality of, in particular, various diaphragm openings (35) of fixed shapes, and it being possible by rotating the rollers (36) to adjust the diaphragm setting by varying the diaphragm openings (35).

22. Optical imaging device according to Claim 21, characterized in that the tension of the sheet-metal strip (7c), and the height of the diaphragm opening (35), are kept constant by at least two additional guide rollers (37), which cause a resilient pretensioning, the first roller (36) being arranged in a fixed fashion, and the second (36) being supported flexibly in the spacing direction.

23. Optical imaging device according to Claim 21 or 22, characterized in that the position of the diaphragm openings (35) can be determined by markings, in particular by cut-outs (38), at the edge of the sheet-metal strip (7c).

24. Optical imaging device according to one of Claims 1 to 23, characterized in that it is used as a projection objective (1), in particular in a projection exposure machine (40) for microlithography for producing semiconductor components.

25. Diaphragm device for stopping down an optical imaging device, in particular an objective (1) for microlithography in the field of EUVL for producing semiconductor components in accordance with one of Claims 1 to 24.